types.—Hallstatt in Austria, its places of burial, and its civilization, by Dr. Hörnes. This is an extremely interesting summary of the important discoveries made within the last few years in the Hallstattian burying-grounds of Slavonian Austria, more especially at Watsch in Carniola, where the beauty and finish of the carved baldrics and belts have led contemporary palæontologists to regard them as an evidence of the existence in Central Europe of an early civilization which had already attained to considerable artistic culture before its extinction under the weight of advancing hordes of barbarian invaders. The necropolis of Hallstatt, for our acquaintance with which we are indebted to Baron Sacken, still remains unrivalled for the splendour and variety of its antiquities, notwithstanding the marvellous results of the recent Carniolian and Croatian finds. Between 1846 and 1863, Sacken and Ramsäuer published reports of their explorations of nearly 1000 tombs; while since that period the number of graves explored has risen to nearly 1900. Both at Hallstatt and Watsch the rites of interment and incineration had been followed with nearly equal frequency, but although in the case of the latter the graves appear to have been most richly supplied with gold ornaments and carved bronze arms, the abundance of yellow amber, and of decorative objects of the toilet which are found buried with the unburnt skeletons render it difficult to decide which of the two methods of disposing of the dead was regarded as the more distinguished. The cranial type is generally dolichocephalous, with a retreating forehead and long slightly prognathic face, resembling what is known in Germany as the "Reihengräbertypus." According to Sacken, the necropolis of Hallstatt dates from the third or fourth century B.C., revealing the presence in those regions of the Eastern Alps of the so-called Galli Faurisci, who prior to the Roman domination must have been familiar with an advanced stage of civilization and decorative art, in which the influence of Greek art is undeniable. This is indeed strongly manifested both in the workmanship and the forms of multitudinous objects revealed by the exploration not merely of the Hallstattian tombs, but of the prehistoric station of Salzberg, whose discovery last year has added new interest to the still contested problem of the origin of the early culture of the Alpine races of Central Europe.

Rivista Scientifico-Industriale, May 15.—On sand showers, by Prof. P. Francesco Denza. His protracted observation of this meteoric phenomenon leads the author to infer that it is not sporadic, as is commonly supposed, but periodical, though subject to occasional disturbances. Its recent reappearance in several parts of Italy, after a considerable interruption, confirms the opinion already advanced by him, that the sands have their origin in the North African deserts, whence they are borne by the high southern gales as far as, and occasionally even beyond, the Alps. About the beginning of May atmospheric waves of low pressure advanced from West Africa across the Mediterranean to South-West Europe, causing a heavy rainfall as far north as the British Isles. In Sicily and Piedmont the showers were mixed with sands, while elsewhere the foliage was covered with a perceptible layer of dust. On May 12 a violent sandstorm raged in the North Sahara, as announced by telegrams from Biskra (Algeria), and this was soon followed by fresh downpours and by another shower of sand in North Italy far more intense than the first. In many parts of the Ligurian Alps and of Lombardy not only the vegetation, but the roofs of houses, terraces, marble monuments (in Turin and Milan), were strewn with fine particles, specimens of which were collected in various districts. The coincidence of the African simoom and the Mediterranean scirocco charged with sand leaves no doubt as to the real origin of the phenomenon popularly attributed to the effects of the April *luna rossa* ("red moon"). Prof. Denza's interesting communication is dated from the Observatory of Moncalieri (Piedmont), May 18, 1889.

Bulletin de l'Académie Royale de Belgique, May.—On a new method of testing for bromine, by Fréderic Swarts. This method, which yields excellent results, is based on the well-known fact that resorcinic phtalin (fluorescin) is transformed to its tetra-bromuretted derivative (eosine) characterized by a beautiful pink colour. The reaction consists in liberating hydrobromic acid, which is immediately oxidized by the hypochlorous acid. The bromine thus obtained then acts on the fluorescin, converting it into eosine, which is transformed to a pink salt under the influence of a slight excess of alkali. This reaction is so sensitive that it succeeds with a tenth of a cubic centimetre of water containing a hundred thousandth of potassium bromide, a quantity corresponding to a thousandth of a milligramme of this salt. In the case of iodine, it detects the presence of bromine in sea-water without submitting it to any preliminary treatment.—G. Van der Mensbrugghe describes a curious experiment in capillary attraction, the explanation of which is reserved for a future communication. The subject has engaged this physicist's attention since the year 1883, when he announced a simple method of demonstrating the contractile force of fluids which cannot easily be reduced to thin seams (*lames*).

Das Wetter (Brunswick) for June contains an article, by Dr. B. Andries, on the cold period of May, which generally obtains about the 10th of that month; the 11th to 13th being known as the three "ice-saints." There is no doubt that each year frosts occur in May, after several days of warm weather have led us to hope for continued increase of temperature. But the author shows, from long series of observations at Bremen and Paris, that the same thing occurs in April and June, and that the weather of May is more uniform than all the other months, except October, which exhibits the same regularity in decrease of temperature that May does in the increase of the same. The variability arises from the influence of cyclones advancing from the Atlantic. In the interior of the Continent, the temperature becomes more constant, as the influence of the ocean becomes less. Dr. R. Assmann (the editor of the journal) contributes an article on the microscopic observations on the structure of hoar-frost, &c., made on the Brocken and elsewhere. His observations seem to show that hoar-frost is not always crystalline, but that, if the temperature is only slightly below the freezing-point, the hoar-frost, or rime, is often composed of amorphous particles of ice. A third article, by an anonymous writer, deals with the winters of the south coast of the Crimea. The climate is far from unpleasant; in a normal year, a brilliant autumn follows a dry summer, and a soft air continues far into November. December is generally cold and wet, and January fine; hard frosts do not occur till February, and then the struggle between winter and spring lasts until April. An interesting phenological table is added, showing the different effects upon vegetation between a wet or dry November and December.

Bulletin de l'Académie des Sciences de St. Pétersbourg, nouvelle série, i. (xxxiii.), No. 1.—With this number the *Bulletin* begins a new series, printed in a handy octavo shape.—On the rattle-apparatus of *Crotalus durissus*, by A. Feoktistoff.—On a simplification of Wild's photometer, by H. Wild.—On the solution of mechanical problems resulting in hyperelliptic differential equations, by C. Charlier.—Entomological contributions, by A. Morawitz, being a description of two new Central Asian species of *Carabus* (*C. pupulus* and *C. eous*), and a detailed monograph of many species of the same genus.—On the embryology of *Pteromyzon fluviatilis*, by Ph. Owsjannikoff.—Researches relating to the basicity of antimonic acid, by F. Beilstein and O. Blaese.—On the preparation of rubidium, note by N. Beketoff.—On a new Central Asian Siluroid (*Exostoma oschanini*), by S. Herzenstein.—On the absence of the common squirrel in Caucasia, by E. Büchner. Although Pallas, Nordmann, and Ménétries mentioned the *Sciurus vulgaris* as occurring in the Caucasus, there is not the slightest mention of it in the descriptive parts of their works, nor any representative of it in Ménétries's otherwise remarkable collection, kept in full at the Academy. The common squirrel could not be discovered in the Caucasus by the late M. Bogdanoff, nor by MM. Rossikoff, Mlokossewicz and Ananoff, who searched for it for years. It may have been that Pallas, Nordmann, and Ménétries simply reported the words of the Caucasus Cossacks, who give the Russian name of *byelka*—usually applied to the squirrel—to *Myoxus glis*, which really appears in the Northern Caucasus. It is also worthy of note that the common squirrel does not appear in the Crimea.—Hydrological researches, by Carl Schmidt. Analyses of the thermal springs at Saniba, in the north of Mount Kazbek.—Analyses of the sulphate of aluminium, by Beilstein and Grosset.

SOCIETIES AND ACADEMIES.

LONDON.

Entomological Society, July 3.—Lord Walsingham, F.R.S., President, in the chair.—A letter was read from Mr. E. J. Atkinson, Chairman of the Trustees of the Indian Museum, Calcutta, in which assistance was asked from British entomologists in working out various orders of Indian insects.—The following motion, which had previously been unanimously passed at the meeting of the Council, was read to the Society:—"That papers containing descriptions of isolated species widely remote in classification or distribution are, as a rule, undesirable for publication, as tending to create unnecessary difficulties for faunistic or monographic workers." Mr. McLachlan, Mr. Jacoby, Mr. Elwes, Dr. Sharp, and others took part in the discussion that followed.—Mr. McLachlan, on behalf of Prof. Klapálek, of Prague, who was present as a visitor, exhibited preparations representing the life-history of *Agriotypus armatus*, Walk., showing the curious appendages of the case. Prof. Klapálek, in answer to questions, described the transformations in detail. A discussion followed, in which Mr. McLachlan and Lord Walsingham took part.—Mr. H. J. Elwes exhibited a specimen of an undescribed *Chrysophanus*, taken in the Shan States, Upper Burmah, by Dr. Manders, which was very remarkable on account of the low elevation and latitude at which it was found; its only very near ally appeared to be *Polyommatus Li*, Oberthur, from Western Szechuen, but there was no species of the genus known in the Eastern Himalayas or anywhere in the Eastern tropics.—Mr. G. T. Porritt exhibited a remarkable series of *Arctia mendica*, L., bred from a small batch of eggs found on the same ground at Grimescar, Huddersfield, as the batch from which the series he had previously exhibited before the Society was bred. This year he had bred forty-five specimens, none of which were of the ordinary form of the species: as in the former case, the eggs were found perfectly wild, and the result this year was even more surprising than before.—Mr. R. W. Lloyd exhibited specimens of *Harpalus cupreus*, Steph., and *Cathormiocerus socius*, Boh., recently taken at Sandown, Isle of Wight.—Mr. O. E. Janson exhibited a fine male example of *Theodosia howitti*, Castelnau, a genus of *Cetoniidæ* resembling some of the *Dynastidæ* in the remarkable armature of the head and thorax. The specimen had recently been received from North-West Borneo.—Mr. W. White exhibited specimens of *Heterogynis paradoxa*, Ramb., and stated that this insect represented an extreme case of degeneration, the mature female being only slightly more developed than the larva, the prolegs being quite atrophied. Lord Walsingham made some remarks on the subject.—Mr. T. R. Billups exhibited a fine series of the very rare British beetle, *Medon* (*Lithocharis*) *piceus*, Kr., taken from a heap of weeds and vegetable refuse in the neighbourhood of Lewisham on May 19.—Mr. W. F. Kirby read a paper entitled "Descriptions of new species of Scoliides in the collection of the British Museum, with occasional reference to species already known."—Mr. J. B. Bridgman communicated a paper entitled "Further additions to the Rev. T. A. Marshall's Catalogue of British Ichneumonidæ."—Mr. J. S. Baly communicated a paper entitled "On new species of *Diabrotica* from South America."

Anthropological Institute, June 25.—Dr. John Beddoe, F.R.S., President, in the chair.—Prof. Victor Horsley exhibited some examples of pre-historic trephining and skull-boring from America.—His Excellency Governor Moloney, C.M.G., exhibited some cross-bows, long-bows, quivers, and other weapons of the Yorubas.—The Rev. Dr. Codrington read a paper on poisoned arrows, in which he stated that the natives relied upon the words of incantation used during the manufacture of the arrows much more than the toxical effect of any substance into which they might be dipped or which might be smeared upon them; indeed, that in many cases the so-called "poisoned arrows" were not poisoned at all.—A paper by Mr. Henry Balfour, on the structure and affinities of the composite bow, was read.

PARIS.

Academy of Sciences, July 8.—M. Des Cloizeaux, President, in the chair.—On two new mechanical appliances, by MM. G. Darboux and G. Kœnigs. The first of these apparatus has been devised for the purpose of describing a plane in space by means of jointed rods; the second supplies a representation of the movement of a solid body revolving freely round its centre of gravity. The principles are described on which both have been constructed.—On the relations between the fractures in the terrestrial crust of a given region, and the seismic movements of the same, by M. A. F. Nogués. The author's comparative study of earthquakes in various parts of the world has led him to detect certain relations between these disturbances and the breaks of continuity in the surface of the earth. In the present paper, he shows that, in a given seismic region offering a complicated system of fractures and faults varying in direction, size, and depth, the underground convulsions are correlated with some one of these systems, and entirely independent of the others. His illustrations are drawn mainly from the seismic zone of Andalusia, extending from Seville to the frontier of Murcia.—Influence of temperature on the mechanical properties of iron and steel, by M. André Le Chatelier. In continuation of his previous paper on this subject, the author here gives the results in detail for iron and steel, which are shown to behave quite differently from other metals under like variations of temperature. Three chief phases are distinguished, ranging respectively from 15° to 80° C.; from 100° to about 240°; and from 240° upwards.—On the solubility of carbonic acid gas in chloroform, by M. Woukoloff. Continuing his researches on the law of solubility of the gases, the author here studies the conditions of the solution of carbonic acid in chloroform. With the data obtained he finds that at a temperature of 13° C. his solution does not conform strictly to Dalton's law, although the deviations are very slight, as was also shown to be the case for the bisulphide of carbon.—On the solidification of nitrous acid, by M. Fl. Birhans. In his attempts to solidify anhydrous nitric acid still containing small quantities of hyponitrous acid, the author found that it was necessary to operate at a temperature of from $-52°$ to $-54°$, obtained by the evaporation of the methyl chloride by means of a current of dry air.—On the cobaltites of baryta, and on the existence of a dioxide of cobalt with acid properties, by M. G. Rousseau. The experiments here described demonstrate the existence of a cobaltous acid analogous to manganous acid, but weaker. The maximum of stability of the manganite of baryta appears to be situated in the neighbourhood of 1100° C. At lower or higher temperatures this compound becomes dissociated like the hydrocarburets heated to the point of decomposition.—On an oxybromide of copper analogous to atacamite, by M. Et. Brun. M. Berthelot has noticed that when a clear solution of cuprous chloride in cupric chloride is exposed to the air, a greenish precipitate of oxychloride is formed, which is "probably identical with atacamite." The same reaction is produced by substituting for the cuprous chloride as a solvent the ammonium, sodium, and potassium chlorides. From the last two is obtained a crystalline powder, yielding on analysis the numbers corresponding to the formula of atacamite: $\mathrm{CuCl}, 3\mathrm{CuO}, 4\mathrm{HO}$. M. Brun's present researches aim at the production of an oxybromide of copper from the corresponding bromides. The substance thus obtained possesses a constitution analogous to atacamite, which it closely resembles in its properties and mode of formation.—On the disturbances of the vision consequent on microscopic observation, by M. J. J. Landerer.—The large bones of the anthropoid apes, by M. Etienne Rollet. Since his communication of December 10, 1888, the author has made fresh measurements on the complete skeletons of forty-two adult apes, the results of which are here given in detail. From a comparative study of these figures it appears that the gorilla and chimpanzee approach nearest to man, but in different degrees, the orang holding the third place. But great differences exist between the proportions of the human frame and those of all the bimanous apes.

BERLIN.

Physical Society, June 21.—Prof. Kundt, President, in the chair.—Dr. Fröhlich demonstrated experimentally his new method of recording vibrations in the form of curves; the method has been recently described verbally to the Society. Light from an electric arc-lamp was made to fall upon a small mirror, attached either to the vibrating plate of a telephone, or to a piece of card covered with a thin film of iron, or to a thin india-rubber membrane. From this mirror it was reflected on to a polygonal rotating mirror, and by this on to a transparent screen, being thus made visible to the whole audience either as a spot of light when the rotating mirror was at rest, or as a line of light when it was set in motion. On sounding various organ-pipes in front of the receiver of the telephone, many very pretty curves were seen; on singing the vowels into the telephone, very characteristic curves were seen crossing the screen; so also with the consonant *r*, whereas on the other hand *s* produced no effect. The next experiment consisted in connecting the rotation of the mirror with the interrupted electric current, whose action was under investigation, in such a way that the vibrations of the membrane produced by the current gave rise to persistent curves upon the screen. The current from a battery produced an interrupted sinuous line of light, in which each rise of the curve was somewhat slower than the steeper fall of the same. On introducing a coil into the circuit the curve showed no change as long as the telephone was in front of the coil; when it came behind the coil, the curve described was almost a sine-curve. On putting an electro-magnet into the circuit the amplitude of the curves was less; so also when self-induction existed in the circuit, while at the same time the rise and fall of each part of the curve was less steep. A condenser gave rise to a curve with very sharp-pointed sinuosities. An apparatus for producing alternating currents gave rise to a regular sine-curve, which was affected by a coil electro-magnet and condenser in the same way as was the curve due to a battery current. Lastly, experiments were made with an induction-coil. On placing the telephone in the primary circuit, the vibrations of its plate gave rise to uniform sine-waves, whose height was less when the telephone was introduced into the secondary circuit, while at the same time they showed a phasic difference of ¼ wave-length. This change of phase due to induction, as exhibited in most striking manner to the large assembled audience, can be recorded by photography of the curves and thus submitted to exact measurement.—Prof. Gad gave a short account of researches made, in conjunction with Dr. Heymans, on the effect of temperature upon muscular contraction. These are to be the subject of a more extended communication to the Physiological Society.

Physiological Society, June 28.—Prof. du Bois-Reymond, President, in the chair.—Prof. Gad gave an account of experiments which he had made, in conjunction with Dr. Heymans, on the influence of temperature upon the working-power of muscles. In accordance with Fick's procedure, the muscles were experimented upon not only in an isotonic condition, where there is no change of initial tension, and stimulation leads merely to a shortening of the muscle, but also in an isometric condition, where there can be no change of length in the muscle, and stimulation produces only a change of its tension. Various muscles from frogs were examined at temperatures of 36°, 30°, 13°, 5°, 0°, and - 5° C., being freely suspended in a metallic cylinder immersed in a water-bath. The muscles were stimulated electrically by maximal and super-maximal induction-shocks due to breaking the primary circuit, these being single or repeated or tetanizing. The curve of the isotonic muscle was symmetrical at 19° C.; at 5° C. it rose much more slowly, and was both higher and longer than at 19° C. At temperatures down to and below 0° C. the rise of the curve was still slower and its height less than at 5° C., but on the other hand its length was greater. At higher temperatures the height of contraction was greater than at 5° C., the duration less than at 19° C., and the curve of contraction was symmetrical. At still higher temperatures there was a very considerable fall in the height of contraction, and its duration was still shorter than before. Irritability disappears immediately before the occurrence of heat-rigor. The curves of a muscle in the isometric condition were an exact reversal of those for the isotonic: low and short at 40° C. to 36° C., they were longer and very high at 30° C. At 19° C. there was a very marked diminution in height, while the length was slightly greater; at 5° C. the curve was again higher than at 19° C. and much longer, and below 0° C. lower and longer. When stimulated by a tetanizing current the curve of the isotonic muscle was highest at 30° C., but fell very rapidly from this height, a sign of rapid exhaustion. At 19° C. the curve rose to a less height, and less precipitately, and fell quite suddenly on the cessation of the stimulus. At 5° C. the curve rose more gradually to a less height, and was prolonged considerably after the stimulus was removed, and this was also the case at temperatures below 5° C. The curve of tetanus for an isometric muscle was again, as in the case of single contractions, an exact reversal of that obtained from an isotonic muscle. When discussing the results of the above experiments, the author gave special prominence to the facts that the height of the curve of contraction is least at 19° C. (the temperature of the room) and is increased by either warming or cooling the muscle; further that the duration of the contraction, which is about 0·1–0·2 second at 19° C., increases rapidly as the temperature falls, and is as much as 2·6 seconds at - 5° C. In explanation of the first fact the author assumed that, in accordance with Fick's hypothesis, during the conbustion of carbohydrates and fats to carbon-dioxide and water some intermediate product (? lactic acid) is formed, and acts as a stimulus: the various temperatures under which the muscle works must then be supposed to have varying influences upon the formation and subsequent final oxidation of this intermediate product.—Dr. Obermüller described a new reaction for cholesterin which he had discovered. It consists in treating cholesterin with propionic-anhydride; this leads to the formation of a compound of propionic acid and cholesterin, which on being fused and allowed to cool shows, even in minute traces of the substance, a fine play of colours from violet through blue and green to red. In the green stage the compound consists of minute spheroidal crystals, which are larger in the red stage, and show a black cross when examined between crossed Nicols.

VIENNA.

Imperial Academy of Sciences, April 11.—The following papers were read:—On the constitution of the quinine-alkaloids, by H. Skraup.—On some aldehyde-like products of the condensation of urea and their tests, by E. Luedy.—Remarks on the comet discovered by Barnard on March 31, by E. Weiss.—On the diffusion of bases and acids, by E. Stefan.—On desiccative oleic acids, by K. Hazura.—On oxidation of non-saturated fatty acids by potassium permanganate, by A. Gruessner and K. Hazura.—Contribution to the flora of the East (on the plants collected in 1885 in Pamphylia by Dr. Heider), by R. von Wettstein.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

Matriculation Directory, No. 6, June 1889 (Clive).—A Text-book of General Therapeutics: W. Hale White (Macmillan).—Lord Howe Island, its Zoology, Geology, and Physical Characters (Sydney, Potter).—Fallow and Fodder Crops: J. Wrightson (Chapman and Hall).—The Fauna of British India, including Ceylon and Burma; Fishes, vol. i.: F. Day (Taylor and Francis).—Veröffentlichungen der Grossherzoglichen Sternwarte zu Karlsruhe, Drittes Heft: Dr. W. Valentiner (Karlsruhe).—Annalen der k. k. Universitäts-Sternwarte in Wien (Währing), v. and vi. Band (Williams and Norgate).—Ancient Art of the Province of Chiriqui, U.S. of Columbia; W. H Holmes (Washington).—A Study of the Textile Art: W. H. Holmes (Washington).—The Cave Fauna of North America, with Remarks on the Anatomy of the Brain and Origin of the Blind Species (National Academy of Sciences, vol. iv., First Memoir).—Who are the American Indians: H. W. Henshaw (Washington).—Journal of Anatomy and Physiology, July (Williams and Norgate).

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